26. Data Handling-IV (Probability)

Exercise 26.1

1. Question

The probability that it will rain tomorrow is 0.85. What is the probability that it will not rain tomorrow?

Answer

The probability of tomorrow rain P(E) = 0.85

Probability of not raining is given by $P(\bar{E})$ = 1 – P(E)

Therefore probability of not raining = $P(\bar{E})$ = 1 – 0.85 = 0.15

2. Question

A die thrown. Find the probability of getting:

(i) a prime number

(ii) 2 or 4

(iii) a multiple of 2 or 3

Answer

(i) Outcomes of a die are: 1, 2, 3, 4, 5, 5 and 6

Total number of outcome = 6

Prime numbers are: 1, 3 and 5

Total number of prime numbers = 3

Probability of getting a prime number $= \frac{Total\ prime\ numbers}{Total\ number\ of\ outcomes} = \frac{3}{6} = \frac{1}{2}$

Therefore probability of getting a prime number = $= \frac{1}{2}$

(ii) Outcomes of a die are: 1, 2, 3, 4, 5, 5 and 6

Total number of outcome = 6

Probability of getting 2 and 4 is $= \frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{2}{6} = \frac{1}{3}$

Therefore probability of getting 2 and 4 is $\frac{1}{3}$

(iii) Outcomes of a die are: 1, 2, 3, 4, 5, 5 and 6

Multiples of 2 and 3 are = 2, 3, 4 and 6

Total number of multiples are 4

Probability of getting a multiple of 2 or 3 is $= \frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{4}{6} = \frac{2}{3}$

Therefore probability of getting a multiple of 2 or 3 $= \frac{2}{3}$

3. Question

In a simultaneous throw of a pair of dice, find the probability of getting:

(i) 8 as the sum

(ii) a doublet

(iii) a doublet of prime numbers

(iv) a doublet of odd numbers

(v) a sum greater than 9

(vi) An even number on first

(vii) an even number on one and a multiple of 3 on the other

(viii) neither 9 nor 11 as the sum of the numbers on the faces

(ix) a sum less than 6

(x) a sum less than 7

(xi) a sum more than 7

(xii) at least once

(xiii) a number other than 5 on any dice.

Answer

(i) 8 as the sum

Total number of outcomes when a pair of die is thrown simultaneously is:

Here the first number denotes the outcome of first die and second number the outcome of second die.

TABLE 1

First Die / Second die	1	2	3	4	5	6
1	1, 1	1, 2	1, 3	1, 4	1, 5	1, 6
2	2, 1	2, 2	2, 3	2, 4	2, 5	2, 6
3	3, 1	3, 2	3, 3	3, 4	3, 5	3, 6
4	4, 1	4, 2	4, 3	4, 4	4, 5	4, 6
5	5, 1	5, 2	5, 3	5, 4	5, 5	5, 6
6	6, 1	6, 2	6, 3	6, 4	6, 5	6, 6

Total number of outcomes in the above table are 36

Numbers of outcomes having 8 as sum are: (6, 2), (5, 3), (4, 4), (3, 5) and (2, 6)

Therefore numbers of outcomes having 8 as sum are 5

Probability of getting numbers of outcomes having 8 as sum is $= \frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{5}{36}$

Therefore Probability of getting numbers of outcomes having 8 as sum is $= \frac{5}{36}$

(ii) a doublet

Total number of outcomes in the above table 1 are 36

Numbers of outcomes as doublet are: (1, 1), (2, 2), (3, 3), (4, 4), (5, 5) and (6, 6)

Therefore Numbers of outcomes as doublet are 6

Probability of getting numbers of outcomes as doublet is $= \frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{6}{36} = \frac{1}{6}$

Therefore Probability of getting numbers of outcomes as doublet is $= \frac{1}{6}$

(iii) a doublet of prime numbers

Total number of outcomes in the above table 1 are 36

Numbers of outcomes as doublet of prime numbers are: (1, 1), (3, 3), (5, 5)

Therefore Numbers of outcomes as doublet of prime numbers are 3

Probability of getting numbers of outcomes as doublet of prime numbers is $= \frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{3}{36} = \frac{1}{12}$

Therefore Probability of getting numbers of outcomes as doublet of prime numbers is $= \frac{1}{12}$

(iv) a doublet of odd numbers

Total number of outcomes in the above table 1 are 36

Numbers of outcomes as doublet of odd numbers are: (1, 1), (3, 3), (5, 5)

Therefore Numbers of outcomes as doublet of odd numbers are 3

Probability of getting numbers of outcomes as doublet of odd numbers is $= \frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{3}{36} = \frac{1}{12}$

Therefore Probability of getting numbers of outcomes as doublet of odd numbers is $= \frac{1}{12}$

(v) a sum greater than 9

Total numbers of outcomes in the above table 1 are 36

Numbers of outcomes having sum greater than 9 are: (4, 6), (5, 5), (5, 6), (6, 6), (6, 4), (6, 5)

Therefore Numbers of outcomes having sum greater than 9 are 6

Probability of getting numbers of outcomes having sum greater than 9 is $= \frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{6}{36} = \frac{1}{6}$

Therefore Probability of getting numbers of outcomes having sum greater than 9 is $= \frac{1}{6}$

(vi) An even number on first

Total numbers of outcomes in the above table 1 are 36

Numbers of outcomes having an even number on first are: (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5) and (6, 6)

Therefore Numbers of outcomes having an even number on first are 18

Probability of getting numbers of outcomes having An even number on first is = $\frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{18}{36} = \frac{1}{2}$

Therefore Probability of getting numbers of outcomes having an even number on first is $= \frac{1}{2}$

(vii) an even number on one and a multiple of 3 on the other

Total numbers of outcomes in the above table 1 are 36

Numbers of outcomes having an even number on one and a multiple of 3 on the other are: (2, 3), (2, 6), (4, 3), (4, 6), (6, 3) and (6, 6)

Therefore Numbers of outcomes having an even number on one and a multiple of 3 on the other are 6

Probability of getting an even number on one and a multiple of 3 on the other is = $\frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{6}{36} = \frac{1}{6}$

Therefore Probability of getting an even number on one and a multiple of 3 on the other is $= \frac{1}{6}$

(viii) neither 9 nor 11 as the sum of the numbers on the faces

Total numbers of outcomes in the above table 1 are 36

Numbers of outcomes having 9 nor 11 as the sum of the numbers on the faces are: (3, 6), (4, 5), (5, 4), (5, 6), (6, 3) and (6, 5)

Therefore Numbers of outcomes having neither 9 nor 11 as the sum of the numbers on the faces are 6

Probability of getting 9 nor 11 as the sum of the numbers on the faces is $= \frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{6}{36} = \frac{1}{6}$

The probability of outcomes having 9 nor 11 as the sum of the numbers on the faces P(E) $= \frac{1}{6}$

Probability of outcomes **not** having 9 nor 11 as the sum of the numbers on the faces is given by P($\bar{E}$) = $1-\frac{1}{6}=\frac{6-1}{6}=\frac{5}{6}$

Therefore probability of outcomes **not** having 9 nor 11 as the sum of the numbers on the faces = P($\bar{E}$) = $\frac{5}{6}$

Therefore Probability of getting neither 9 nor 11 as the sum of the numbers on the faces is $=\frac{1}{6}$

(ix) a sum less than 6

Total numbers of outcomes in the above table 1 are 36

Numbers of outcomes having a sum less than 6 are: (1, 1), (1, 2), (1, 3), (1, 4), (2, 1), (2, 2), (2, 3), (3, 1), (3, 2), (4, 1)

Therefore Numbers of outcomes having a sum less than 6 are 10

Probability of getting a sum less than 6 is $=\frac{Total\ numbers}{Total\ number\ of\ outcomes}=\frac{10}{36}=\frac{5}{18}$

Therefore Probability of getting sum less than 6 is $=\frac{5}{18}$

(x) a sum less than 7

Total numbers of outcomes in the above table 1 are 36

Numbers of outcomes having a sum less than 7 are: (1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (2, 1), (2, 2), (2, 3), (2, 4), (3, 1), (3, 2), (3, 3), (4, 1), (4, 2), (5, 1)

Therefore Numbers of outcomes having a sum less than 7 are 15

Probability of getting a sum less than 7 is $=\frac{Total\ numbers}{Total\ number\ of\ outcomes}=\frac{15}{36}=\frac{5}{12}$

Therefore Probability of getting sum less than 7 is $=\frac{5}{12}$

(xi) a sum more than 7

Total numbers of outcomes in the above table 1 are 36

Numbers of outcomes having a sum more than 7 are: (2, 6), (3, 5), (3, 6), (4, 4), (4, 5), (4, 6), (5, 3), (5, 4), (5, 5), (5, 6), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)

Therefore Numbers of outcomes having a sum more than 7 are 15

Probability of getting a sum more than 7 is $=\frac{Total\ numbers}{Total\ number\ of\ outcomes}=\frac{15}{36}=\frac{5}{12}$

Therefore Probability of getting sum more than 7 is $=\frac{5}{12}$

(xii) at least once

Total numbers of outcomes in the above table 1 are 36

Therefore Numbers of outcomes for atleast once are 11

Probability of getting outcomes for atleast once is $=\frac{Total\ numbers}{Total\ number\ of\ outcomes}=\frac{11}{36}$

Therefore Probability of getting outcomes for atleast once is $=\frac{11}{36}$

(xiii) a number other than 5 on any dice.

Total numbers of outcomes in the above table 1 are 36

Numbers of outcomes having 5 on any die are: (1, 5), (2, 5), (3, 5), (4, 5), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6), (6, 5)

Therefore Numbers of outcomes having outcomes having 5 on any die are 15

Probability of getting 5 on any die is $= \frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{11}{36} = \frac{11}{36}$

Therefore Probability of getting 5 on any die is $= \frac{11}{36}$

Probability of **not** getting 5 on any die P($\bar{E}$) = 1 –P (E)

P($\bar{E}$) = $1 - \frac{11}{36} = \frac{36-11}{36} = \frac{25}{36}$

4. Question

Three coins are tossed together. Find the probability of getting:

(i) exactly two heads

(ii) at least two heads

(iii) at least one head and one tail

(iv) no tails

Answer

(i) exactly two heads

Possible outcome of tossing three coins are: HTT, HHT, HHH, HTH, TTT, TTH, THT, THH

Numbers of outcomes of exactly two heads are: 3

Probability of getting exactly two heads is = $\frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{3}{8}$

Therefore Probability of getting exactly two heads is $= \frac{3}{8}$

(ii) at least two heads

Possible outcome of tossing three coins are: HTT, HHT, HHH, HTH, TTT, TTH, THT, THH

Numbers of outcomes of atleast two heads are: 4

Probability of getting atleast two heads is = $\frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{4}{8} = \frac{1}{2}$

Therefore Probability of getting atleast two heads is $= \frac{1}{2}$

(iii) at least one head and one tail

Possible outcome of tossing three coins are: HTT, HHT, HHH, HTH, TTT, TTH, THT, THH

Numbers of outcomes of at least one head and one tail are: 6

Probability of getting at least one head and one tail is = $\frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{6}{8} = \frac{3}{4}$

Therefore Probability of getting at least one head and one tail is $= \frac{3}{4}$

(iv) no tails

Possible outcome of tossing three coins are: HTT, HHT, HHH, HTH, TTT, TTH, THT, THH

Numbers of outcomes of no tails are: 1

Probability of getting no tails is = $\frac{Total\ numbers}{Total\ number\ of\ outcomes} = \frac{1}{8}$

Therefore Probability of getting no tails is $= \frac{1}{8}$

5. Question

A card is drawn at random from a pack of 52 cards. Find the probability that the card drawn is:

(i) a black king

(ii) either a black card or a king

(iii) black and a king

(iv) a jack, queen or a king

(v) neither a heart nor a king

(vi) spade or an ace

(vii) neither an ace nor a king

(viii) neither a red card nor a queen

(ix) other than an ace

(x) a ten

(xi) a spade

(xii) a black card

(xiii) the seven of clubs

(xiv) jack

(xv) the ace of spades

(xvi) a queen

(xvii) a heart

(xviii) a red card

Answer

(i) a black king

Total numbers of cards are 52

Number of black king cards = 2

Probability of getting black king cards is = $\frac{Total\ number\ of\ black\ king\ cards}{Total\ number\ of\ cards} = \frac{2}{52} = \frac{1}{26}$

Therefore Probability of getting black king cards is $= \frac{1}{26}$

(ii) either a black card or a king

Total numbers of cards are 52

Number of either a black card or a king = 28

Probability of getting either a black card or a king is = $\frac{Total\ number\ of\ either\ a\ black\ or\ a\ king}{Total\ number\ of\ cards} = \frac{28}{52} = \frac{7}{13}$

Therefore Probability of getting either a black card or a king is $= \frac{7}{13}$

(iii) black and a king

Total numbers of cards are 52

Number of black and a king = 2

Probability of getting black and a king is = $\frac{Total\ number\ of\ black\ and\ a\ king}{Total\ number\ of\ cards} = \frac{2}{52} = \frac{1}{26}$

Therefore Probability of getting black and a king is $= \frac{1}{26}$

(iv) a jack, queen or a king

Total numbers of cards are 52

Number of a jack, queen or a king = 12

Probability of getting a jack, queen or a king is $= \frac{Total\ number\ of\ jack, queen\ or\ king}{Total\ number\ of\ cards} = \frac{12}{52} = \frac{3}{13}$

Therefore Probability of getting a jack, queen or a king is $= \frac{3}{13}$

(v) neither a heart nor a king

Total numbers of cards are 52

Total number of heart cards = 13

Probability of getting a heart is $= \frac{Total\ number\ of\ heart}{Total\ number\ of\ cards} = \frac{13}{52} = \frac{1}{4}$

Total number of king cards = 4

Probability of getting a king is $= \frac{Total\ number\ of\ king}{Total\ number\ of\ cards} = \frac{4}{52} = \frac{1}{13}$

Total probability of getting a heart and a king $= \frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$

Therefore probability of getting neither a heart nor a king = $1 - \frac{4}{13} = \frac{9}{13}$

(vi) spade or an ace

Total numbers of cards are 52

Number of spade cards = 13

Probability of getting spade cards is $= \frac{Total\ number\ of\ spade\ cards}{Total\ number\ of\ cards} = \frac{13}{52}$

Total numbers of cards are 52

Number of ace cards = 4

Probability of getting ace cards is $= \frac{Total\ number\ of\ ace\ cards}{Total\ number\ of\ cards} = \frac{4}{52}$

Probability of getting ace and spade cards is $= \frac{Total\ number\ of\ ace\ and\ spade\ cards}{Total\ number\ of\ cards} = \frac{1}{52}$

Probability of getting an ace or spade cards is $= \frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{13+4-1}{52} = \frac{16}{52} = \frac{4}{13}$

Therefore Probability of getting an ace or spade cards is $= \frac{4}{13}$

(vii) neither an ace nor a king

Total numbers of cards are 52

Number of king cards = 4

Number of ace cards = 4

Total number of cards = 4 + 4 = 8

Total number of neither an ace nor a king are= 52 – 8 = 44

Probability of getting neither an ace nor a king is $= \frac{Total\ number\ of\ cards}{Total\ number\ of\ cards} = \frac{44}{52} = \frac{11}{13}$

Therefore Probability of getting neither an ace nor a king is $= \frac{11}{13}$

(viii) neither a red card nor a queen

Total numbers of cards are 52

Red cards include hearts and diamonds

Number of hearts in a deck 52 cards = 13

Number of diamonds in a deck 52 cards = 13

Number of queen in a deck 52 cards = 4

Total number of red card and queen = 13 + 13 + 2 = 28,

[since queen of heart and queen of diamond are removed]

Number of card which is neither a red card nor a queen = 52 - 28 = 24

Probability of getting neither a king nor a queen is = $\frac{Total\ number\ of\ cards}{Total\ number\ of\ cards} = \frac{24}{52} = \frac{6}{13}$

Therefore Probability of getting neither a king nor a queen is = $\frac{6}{13}$

(ix) other than an ace

Total numbers of cards are 52

Total number of ace cards = 4

Total number of non-ace cards = 52-4 = 48

Probability of getting non-ace is = $\frac{Total\ number\ of\ non-ace\ cards}{Total\ number\ of\ cards} = \frac{48}{52} = \frac{12}{13}$

(x) a ten

Total numbers of cards are 52

Total number of ten cards = 4

Probability of getting non-ace is = $\frac{Total\ number\ of\ ten\ cards}{Total\ number\ of\ cards} = \frac{4}{52} = \frac{1}{13}$

(xi) a spade

Total numbers of cards are 52

Total number of spade cards = 13

Probability of getting spade is = $\frac{Total\ number\ of\ spade\ cards}{Total\ number\ of\ cards} = \frac{13}{52} = \frac{1}{4}$

(xii) a black card

Total numbers of cards are 52

Cards of spades and clubs are black cards.

Number of spades = 13

Number of clubs = 13

Therefore, total number of black card out of 52 cards = 13 + 13 = 26

Probability of getting black cards is = $\frac{Total\ number\ of\ black\ cards}{Total\ number\ of\ cards} = \frac{26}{52} = \frac{1}{2}$

(xiii) the seven of clubs

Total numbers of cards are 52

Number of the seven of clubs cards = 1

Probability of getting the seven of clubs cards is = $\frac{Total\ number\ of\ the\ seven\ of\ clubs\ cards}{Total\ number\ of\ cards} = \frac{1}{52}$

(xiv) jack

Total numbers of cards are 52

Number of jack cards = 4

Probability of getting jack cards is = $\frac{Total\ number\ of\ jack\ cards}{Total\ number\ of\ cards} = \frac{4}{52} = \frac{1}{13}$

(xv) the ace of spades

Total numbers of cards are 52

Number of the ace of spades cards = 1

Probability of getting ace of spades cards is = $\frac{Total\ number\ of\ ace\ of\ spade\ cards}{Total\ number\ of\ cards} = \frac{1}{52} = \frac{1}{52}$

(xvi) a queen

Total numbers of cards are 52

Number of queen cards = 4

Probability of getting queen cards is = $\frac{Total\ number\ of\ queen\ cards}{Total\ number\ of\ cards} = \frac{4}{52} = \frac{1}{13}$

(xvii) a heart

Total numbers of cards are 52

Number of heart cards = 13

Probability of getting queen cards is = $\frac{Total\ number\ of\ heart\ cards}{Total\ number\ of\ cards} = \frac{13}{52} = \frac{1}{4}$

(xviii) a red card

Total numbers of cards are 52

Number of red cards = 13+13 = 26

Probability of getting queen cards is = $\frac{Total\ number\ of\ red\ cards}{Total\ number\ of\ cards} = \frac{26}{52} = \frac{1}{2}$

6. Question

An urn contains 10 red and 8 white balls. One ball is drawn at random. Find the probability that the ball drawn is white.

Answer

Total numbers of red balls = 10

Number of red white balls = 8

Total number of balls = 10 + 8 = 18

Probability of getting a white is = $\frac{Total\ number\ of\ white\ balls}{Total\ number\ of\ balls} = \frac{8}{18} = \frac{4}{9}$

7. Question

A bag contains 3 red balls, 5 black balls and 4 white balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is :

(i) White?

(ii) red?

(iii) black?

(iv) not red?

Answer

(i) White?

Total numbers of red balls = 3

Number of black balls = 5

Number of white balls = 4

Total number of balls = 3 + 5 + 4 = 12

Probability of getting a white ball is = $\frac{Total\ number\ of\ white\ balls}{Total\ number\ of\ balls} = \frac{4}{12} = \frac{1}{3}$

(ii) red?

Total numbers of red balls = 3

Number of black balls = 5

Number of white balls = 4

Total number of balls = 3 + 5 + 4 = 12

Probability of getting a red ball is = $\frac{Total\ number\ of\ red\ balls}{Total\ number\ of\ balls} = \frac{3}{12} = \frac{1}{4}$

(iii) black?

Total numbers of red balls = 3

Number of black balls = 5

Number of white balls = 4

Total number of balls = 3 + 5 + 4 = 12

Probability of getting a black ball is = $\frac{Total\ number\ of\ bleck\ balls}{Total\ number\ of\ balls} = \frac{5}{12}$

(iv) not red?

Total numbers of red balls = 3

Number of black balls = 5

Number of white balls = 4

Total number of Non red balls = 5 + 4 = 9

Probability of getting a non red ball is = $\frac{Total\ number\ of\ non\ red\ balls}{Total\ number\ of\ balls} = \frac{9}{12} = \frac{3}{4}$

8. Question

What is the probability that a number selected from the numbers 1, 2, 3, …., 15 is a multiple of 4?

Answer

Total numbers are 15

Multiples of 4 are = 4, 8, 12

Probability of getting a multiple of 4 is = $\frac{Total\ number\ of\ multiples\ of\ 4}{Total\ numbers} = \frac{3}{15} = \frac{1}{5}$

9. Question

A bag contains 6 red, 8 black and 4 white balls. A ball is drawn at random. What is the probability that ball drawn is not black?

Answer

Total numbers of red balls = 6

Number of black balls = 8

Number of white balls = 4

Total number of Non red balls = 6 + 8 + 4 = 18

Number of non black balls are = 6 + 4 = 10

Probability of getting a non black ball is = $\frac{Total\ number\ of\ non\ black\ balls}{Total\ number\ of\ balls} = \frac{10}{18} = \frac{5}{9}$

10. Question

A bag contains 5 white and 7 red balls. One ball is drawn at random. What is the probability that ball drawn is white?

Answer

Total numbers of red balls = 7

Number of white balls = 5

Total number of Non red balls = 7 + 5 = 12

Probability of getting a non black ball is = $\frac{Total\ number\ of\ white\ balls}{Total\ number\ of\ balls} = \frac{5}{12}$

11. Question

A bag contains 4 red, 5 black and 6 white balls. One ball is drawn from the bag at random. Find the probability that the ball drawn is:

(i) white

(ii) red

(iii) not black

(iv) red or white

Answer

(i) white

Total numbers of red balls = 4

Number of black balls = 5

Number of white balls = 6

Total number of balls = 4 + 5 + 6 = 15

Probability of getting a white ball is = $\frac{Total\ number\ of\ white\ balls}{Total\ number\ of\ balls} = \frac{6}{15} = \frac{2}{5}$

(ii) red

Total numbers of red balls = 4

Number of black balls = 5

Number of white balls = 6

Total number of balls = 4 + 5 + 6 = 15

Probability of getting a red ball is = $\frac{Total\ number\ of\ red\ balls}{Total\ number\ of\ balls} = \frac{4}{15}$

(iii) not black

Total numbers of red balls = 4

Number of black balls = 5

Number of white balls = 6

Total number of balls = 4 + 5 + 6 = 15

Number of non black balls = 4 + 6 = 10

Probability of getting a non black ball is = $\frac{Total\ number\ of\ non\ black\ balls}{Total\ number\ of\ balls} = \frac{10}{15} = \frac{2}{3}$

(iv) red or white

Total numbers of red balls = 4

Number of black balls = 5

Number of white balls = 6

Total number of balls = 4 + 5 + 6 = 15

Number of red and white balls = 4 + 6 = 10

Probability of getting a red or white ball is = $\frac{Total\ number\ of\ red\ or\ white\ balls}{Total\ number\ of\ balls} = \frac{10}{15} = \frac{2}{3}$

12. Question

A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is :

(i) red

(ii) black

Answer

(i) red

Total numbers of red balls = 3

Number of black balls = 5

Total number of balls = 3 + 5 = 8

Probability of getting a red ball is = $\frac{Total\ number\ of\ red\ balls}{Total\ number\ of\ balls} = \frac{3}{8}$

(ii) black

Total numbers of red balls = 3

Number of black balls = 5

Total number of balls = 3 + 5 = 8

Probability of getting a black ball is = $\frac{Total\ number\ of\ black\ balls}{Total\ number\ of\ balls} = \frac{5}{8}$

13. Question

A bag contains 5 red marbles, 8 white marbles, 4 green marbles. What is the probability that if one marble is taken out of the bag at random, it will be

(i) red

(ii) white

(iii) not green

Answer

(i) red

Total numbers of red marbles = 5

Number of white marbles = 8

Number of green marbles = 4

Total number of marbles = 5 + 8 + 4 = 17

Probability of getting a red marble is = $\frac{Total\ number\ of\ red\ marbles}{Total\ number\ of\ marbles} = \frac{5}{17}$

(ii) white

Total numbers of red marbles = 5

Number of white marbles = 8

Number of green marbles = 4

Total number of marbles = 5 + 8 + 4 = 17

Probability of getting a white marble is = $\frac{Total\ number\ of\ white\ marbles}{Total\ number\ of\ marbles} = \frac{8}{17}$

(iii) not green

Total numbers of red marbles = 5

Number of white marbles = 8

Number of green marbles = 4

Total number of marbles = 5 + 8 + 4 = 17

Total number of red and white marbles = 5 + 8 = 13

Probability of getting a non green marble is = $\frac{Total\ number\ of\ non\ green\ marbles}{Total\ number\ of\ marbles} = \frac{13}{17}$

14. Question

If you put 21 consonants and 5 vowels in a bag. What would carry greater probability? Getting a consonant or a vowel? Find each probability?

Answer

Total numbers of cnsonants = 21

Number of white vowels = 5

Total number of alphabets = 21 + 5 = 26

Probability of getting a consonant is = $\frac{Total\ number\ of\ consonants}{Total\ number\ of\ marbles} = \frac{21}{26}$

Probability of getting a vowel is = $\frac{Total\ number\ of\ vowels}{Total\ number\ of\ alphabets} = \frac{5}{26}$

Therefore the probability of getting a consonant is more.

15. Question

If we have 15 boys and 5 girls in a class which carries a higher probability? Getting a copy belonging to a boy or a girl. Can you give it a value?

Answer

Total numbers of boys in a class = 15

Number of girls in a class = 5

Total number of students = 15 + 5 = 20

Probability of getting a copy of a boy is = $\frac{Total\ number\ of\ boys}{Total\ number\ of\ students} = \frac{15}{20} = \frac{3}{4}$

Probability of getting a copy of a girl is = $\frac{Total\ number\ of\ vowels}{Total\ number\ of\ marbles} = \frac{5}{20} = \frac{1}{4}$

Therefore the probability of getting a copy of a boy is more.

16. Question

It you have a collection of 6 pairs of white socks and 3 pairs of black socks. What is the probability that a pair you pick without looking is (i) white? (ii) black?

Answer

Total numbers of white shocks = 6 pairs

Total numbers of black shocks = 3 pairs

Total number pairs of shocks = 6 + 3 = 9

Probability of getting a white shock is $= \frac{Total\ number\ of\ white\ shocks}{Total\ number\ of\ shocks} = \frac{6}{9} = \frac{2}{3}$

Probability of getting a black shock is $= \frac{Total\ number\ of\ black\ shocks}{Total\ number\ of\ shocks} = \frac{3}{9} = \frac{1}{3}$

17. Question

If you have a spinning wheel with 3-green sectors, 1-blue sector and 1-red sector. What is the probability of getting a green sector? Is it the maximum?

Answer

Total numbers of green sectors = 3

Total numbers of blue sector = 1

Total numbers of red sector = 1

Total number of sectors = 3 + 1 + 1 = 5

Probability of getting a green sector is $= \frac{Total\ number\ of\ green\ sectors}{Total\ number\ of\ shocks} = \frac{3}{5}$

Probability of getting a blue sector is $= \frac{Total\ number\ of\ blue\ sectors}{Total\ number\ of\ shocks} = \frac{1}{5}$

Probability of getting a red sector is $= \frac{Total\ number\ of\ red\ sectors}{Total\ number\ of\ shocks} = \frac{1}{5}$

Yes, probability of getting a green sector is maximum.

18. Question

When two dice are rolled:

(i) List the outcomes for the event that the total is odd.

(ii) Find probability of getting an odd total.

(iii) List the outcomes for the event that total is less than 5.

(iv) Find the probability of getting a total less than 5?

Answer

(i) List the outcomes for the event that the total is odd.

Possible outcomes of two dice are:

TABLE 2

First dice / Second dice	1	2	3	4	5	6
1	1, 1	1, 2	1, 3	1, 4	1, 5	1, 6
2	2, 1	2, 2	2, 3	2, 4	2, 5	2, 6
3	3, 1	3, 2	3, 3	3, 4	3, 5	3, 6
4	4, 1	4, 2	4, 3	4, 4	4, 5	4, 6
5	5, 1	5, 2	5, 3	5, 4	5, 5	5, 6
6	6, 1	6, 2	6, 3	6, 4	6, 5	6, 6

Outcomes for the event that the total is odd are: (2, 1), (4, 1), (6, 1), (1, 2), (3, 2), (5, 2), (2, 3), (4, 3), (6, 3), (1, 4), (3, 4), (5, 4), (2, 5), (4, 5), (6, 5), (1, 6), (3, 6), (5, 6)

(ii) Find probability of getting an odd total.

Total numbers of outcomes from two dice are 36

From above we get that the total number of outcomes for the event that the total is odd are 18

Probability of getting an event that the total is odd = $\frac{Total\ number\ of\ events\ with\ ofdd\ total}{Total\ number\ of\ events} = \frac{18}{36} = \frac{1}{2}$

(iii) List the outcomes for the event that total is less than 5.

Total numbers of outcomes from two dice are 36

Total number of outcomes of the events that total is less than 5 are: (1, 1), (2, 1),(3, 1), (1, 2), (2, 2) and (1, 3)

(iv) Find the probability of getting a total less than 5?

Total numbers of outcomes from two dice are 36

Total number of events that total is less than 5 are: (1, 1), (2, 1),(3, 1), (1, 2), (2, 2) and (1, 3)

Probability of getting an event that total is less than 5 = $\frac{Total\ number\ of\ events\ with\ total\ less\ than\ 5}{Total\ number\ of\ events} = \frac{6}{36} = \frac{1}{6}$

Therefore the probability of getting an event that total is less than 5 is $\frac{1}{6}$